

# EUROPEAN PATENT OFFICE

## Patent Abstracts of Japan

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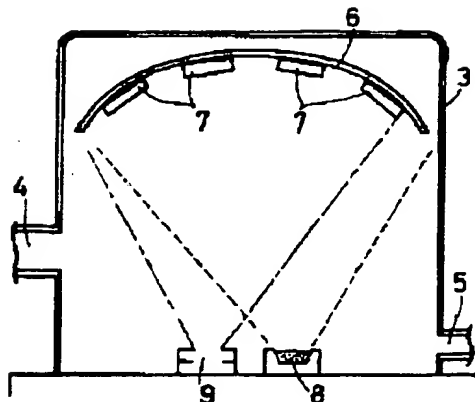
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TITLE : PRODUCTION OF THIN-FILM OPTICAL  
FILTER



**ABSTRACT :** **PURPOSE:** To obviate the generation of the warpage and crack occurring due to internal stresses by laminating and forming thin films on substrate surfaces by an ion assisted vapor deposition method for depositing a thin film forming material by evaporation on the substrate surfaces while projecting the gaseous ions from an ion source to these surfaces.

**CONSTITUTION:** Gaseous  $O_2$  is admitted into a vacuum chamber 3 from a gas inflow port 5 and a specified pressure is maintained in this chamber by continuing the evacuation with a vacuum pump.  $SiO_2$  which is a vapor deposition source 8 is heated in this state with an electron beam and the evaporated  $SiO_2$  is released into the vacuum chamber 3. Simultaneously with this release,  $O^+$  which is the ion source 9, is projected with acceleration current toward the glass substrates 7. The thin-film layers consisting of the  $SiO_2$  released from the vapor deposition source 8 are formed on the surfaces of the substrates 7. The vapor deposition source 8 is then changed with  $TiO_2$  and a stage similar to the above-mentioned stage is executed, by that, the thin-film layers are freshly formed. The optical band-pass filter of 7-layered structures formed by laminating the  $SiO_2$  layers (low-refractive index layers) and the  $TiO_2$  layers (high-refractive index layers) on the glass substrates 7 is produced by alternately repeating the above-mentioned stages.

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